

## **MICROFLUIDIC DEVICES AND SYSTEMS INCORPORATING COVER LAYERS**

### **ABSTRACT OF THE DISCLOSURE**

The present invention provides microfluidic devices that comprise a body structure comprising at least a first microscale channel network disposed therein. The body structure has a plurality of ports or wells disposed in the body structure, where each port is in fluid communication with one or more channels in the first channel network. The devices also include a cover layer comprising a plurality of apertures disposed through the cover layer. The cover layer is mated with the body structure whereby each of the apertures is aligned with a separate one of the plurality of ports. First and second rings are preferentially disposed between the cover layer and the body structure and located circumferentially around each of the apertures of the cover layer. An annular groove is also preferentially disposed between the ring structures to help further minimize the leakage of adhesive or other bonding material into the ports or wells of the device when the cover layer is mated to the body structure.